In Vitro Antibacterial Activities of Two Cationic Hybrid Peptides Derived from Cecropin–melittin Proteins Against Standard and Multidrug Resistant Strains of Vibrio cholerae

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Background & Objectives: *Vibrio cholerae* is a water and foodborne organism that can cause acute watery diarrhea and death. Similar to other pathogenic bacteria, *V. cholerae* strains have been isolated from both clinical and environmental place that resist to various antibiotics. Thus it appears that utilizing alternative agents are necessary to eliminate resistant pathogenic bacteria. In this work, we determined the activity of selected cecropin–melittin CM11 (WKLFKKILKVL-NH2) and CM15 (KWKLFKKIGAVLKVL-NH2) hybrid peptides against standard strain *V.cholerae* ATCC 11623 and 30 clinical isolates with the different degrees of antibiotic resistance.

Methods: The in vitro activity of cationic peptides, CM15 and CM11 was separately investigated in different concentrations (2 to 128 mg/L) against standard strain *V. cholera* ATCC 11623 and 30 clinical isolates by the standard Methods according to NCCLS protocols. Antimicrobial activities were measured by MIC, MBC.

Result: The peptides demonstrated same ranges of inhibitory values: the standard strain in early 24h were more susceptible to peptides (MIC: 4 mg/L and MBC 16 mg/L), but after 48h, the MIC remained constant for the shorter peptide (CM11), the other peptide (CM15) was increased to two times. Although after the first 24h, MIC of shorter peptide was 2-16 mg/L against nosocomial strains but MIC of CM15 was 4-32 mg/L.

Conclusion: According to the bacteriostatic effect of antibacterial agents in MIC, we found that in the minimal inhibitory concentration of these peptides, the bacteria challenged with CM11 between 24 and 48h have not grown but the bacteria challenged with CM15 have grown at the same time. However, CM11 peptide is more effective than CM15 peptide at the first 48h.The present study demonstrated that small peptides (CM11, CM15) have significant activity against clinical isolates of *V. cholerae* in vitro. We hope that these findings will lead to new treatment strategies for the eradication of resistance hospital infections, which is closely associated with persistent hospital environment.

Keywords: Antimicrobial Peptide; *V. Cholerae;* MIC; MBC